

Off-axis head-scatter is the major contributor to doses outside the field of high-energy x-rays. For a dynamically collimated beam, these scattered photons also affect the dose inside the treatment region. Head-scatter is measured for the 6-MV photon beam from a Varian 2100CD linear accelerator. The head scatter off-axis, *HOA*, is defined as the ratio of the dose from head-scatter at off-axis position x to the dose from primary photons on the central axis, with collimator setting $cx \times cy$. Experimentally, it is determined as

$$HOA(cx, cy, x) = (T(cx, cy, x) - P(cx, x))/P(cx, 0),$$

where T is the total dose measured in a miniphantom and P is the primary dose measured at the same location under a narrow beam block with a collimator setting of $cx \times 3$ cm. *HOA* can be fitted to a two-gaussian source model. For field sizes < 15 cm, this model is simplified to $a \cdot ((1-g) \cdot e^{-(x/b_1)^2/2} + g \cdot e^{-(x/b_2)^2/2})$. For $c = 10$ cm, $b_1 = 4.6$ cm, $b_2 = 17$ cm, and $g = 0.08$. *HOA* on the central-axis increases with c to 0.13 for $c = 40$ cm following the square of an error function. The half width at full maximum w of *HOA* increases with c following $w = 1.1 \cdot cx$ for $cx > 15$ cm. For beams of rectangular cross-section with the same cx , w remains unchanged while the value of *HOA* increases with increasing cy . At 2 cm outside the field, *HOA* is 120% of the leakage through the collimator for $c = 10$ cm and is increasing with c .